The Erosion of Coal’s Market Share in the Power Generation Industry

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Intro – What Has Happened?

- Coal-fired electricity market share fell from 51% in 2008 to 31% in 2016
- The primary cause is low natural gas prices
- Secondary causes are regulation and renewables
- Cheaper cost of capital for gas plants is also a cause
- Is this negatively impacting electricity prices? – No.
- Or reliability? – No.
- Should coal-fired (and nuclear) generation be saved?
Direction of Power Flow

NOTE: Turbine icons do not represent the total number or precise location of installations in the region.
A National View

Reserve margin estimates and targets by NERC region, summer 2014

Fuel Mix Change in PJM (Mid-Atlantic)

Change in Generation in PJM (GWh) - 2008 to 2016

Coal: -32%
Gas: 306%
Nuclear: 10%
Hydro: -
Wind: 418%
Other: -

Data Source: Monitoring Analytics, PJM State of the Market Reports.
Coal Capacity on the Margin in PJM: MW Displaced by Wind

Data Source: Monitoring Analytics.
Gas Capacity on the Margin in PJM: MW Displaced by Wind

Data Source: Monitoring Analytics.
Fuel Mix Change in Northeast

Change in electricity generation by fuel in Northeast states, 2006-2016 million kilowatthours

Pennsylvania
New York
New Jersey
Connecticut
Massachusetts
New Hampshire
Maine
Rhode Island
Vermont

coal
natural gas
nuclear
hydroelectric
other renewables
other
Before Marcellus....

- Supply from Western US
- Imports from Canada
- Supply to NE US
- Supply from TX/LA
- LNG Imports
What is happening or about to happen....

- Supply to Western US
- Exports to Canada (gas and ethane)
- Supply to NE US
- Planned ethane exports
- Supply of ethane to TX/LA
- Plans for bi-directional supply
- Planned LNG Exports
Natural Gas Prices – Henry Hub Vs. Marcellus Area Hubs (nominal $/MMBtu)

Select Marcellus Area Vs. Henry Hub Gas Prices

Data Source: EIA.
U.S. Net Generation by Resource (GWh)

Data Source: EIA.
Historical Natural Gas & Coal Prices to Electricity Sector (2016 $/MMBtu)

Data Source: EIA.
EIA Forecasted Natural Gas & Coal Prices to Electricity Sector (2016$/MMBtu)

Data Source: EIA.
What is Being Evaluated

• RTOs, like PJM, are increasing penalty for non-performance

• USDOE’s August 2017 “baseload” study recommendations:
  • Expedite the study of wholesale market pricing structure
  • Support R&D for grid resilience, i.e. response to disruptive events
  • Study valuation of essential reliability services – new and existing
  • Improve bulk power system resilience – define and prepare
  • Expand electric-gas coordination – pipelines, etc.

• Capacity and energy market pricing reform –
  • Is coal adequately compensated for what provides (on-site fuel storage)?
  • Is marginal cost the best price signal for wholesale markets?
  • Is flexibility valued enough?

• Some States are attempting to subsidize coal
Coal Slurry Impoundment

Gas Fractionation Facility